

1 WHAT IS CLAIMED IS

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1. A semiconductor device which receives addresses in synchronism with a clock signal and receives data in synchronism with a strobe signal, said semiconductor device comprising:

10 address-latch circuits which latches the addresses;

 a first control circuit which selects one of said address-latch circuits in sequence in response to the clock signal, and controls the selected one of
15 said address-latch circuits to latch a corresponding one of the addresses in response to the clock signal; and

 a second control circuit which selects one of said address-latch circuits in sequence in response
20 to the strobe signal, and controls the selected one of said address-latch circuits to output a corresponding one of the addresses in response to the strobe signal.

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2. The semiconductor device as claimed in claim 1, further comprising data-latch circuits, each of which latches a corresponding datum of the data in
30 synchronism with the strobe signal, and outputs the corresponding datum of the data in synchronism with the strobe signal.

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3. The semiconductor device as claimed in

1 claim 2, wherein said data-latch circuits operate in
response to a write-enable signal which is generated
in response to a write command to said semiconductor
device.

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10 4. The semiconductor device as claimed in
claim 3, wherein the write-enable signal controls said
first control circuit and said second control circuit
to operate for a predetermined time period after
receiving the write command.

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20 5. The semiconductor device as claimed in
claim 1, wherein said first control circuit includes a
first frequency divider configured to divide a
frequency of the clock signal, and selects one of said
address-latch circuits in sequence by using the
frequency-divided clock signal from said first
frequency divider, and said second control circuit
25 includes a second frequency divider configured to
divide a frequency of the strobe signal, and selects
one of said address-latch circuits in sequence by
using the frequency-divided clock signal from said
second frequency divider.

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35 6. The semiconductor device as claimed in
claim 1, further comprising:
an increment-latch circuit which latches one
of the addresses in synchronism with the clock signal;

1 and
 an address-generation circuit which
 increments the one of the addresses latched by said
 increment-latch circuit by 1, and supplies the
5 incremented address to said address-latch circuits,
 wherein each of said address-latch circuits
 configured so as to be capable of selecting the
 corresponding one of the addresses externally provided
 or the incremented address supplied from said address-
10 generation circuit for the latching operation thereof.

15 7. The semiconductor device as claimed in
 claim 2, wherein said data-latch circuit comprises:
 a first data-latch circuit which latches a
 corresponding datum of the data in synchronism with a
 rising edge of the strobe signal; and
20 a second data-latch circuit which latches a
 corresponding datum of the data in synchronism with a
 falling edge of the strobe signal.

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 8. A semiconductor device which receives
 addresses in synchronism with a clock signal and
 receives data in synchronism with a strobe signal,
30 said semiconductor device comprising:
 data-latch circuits;
 a first control circuit which selects one of
 said data-latch circuits in sequence in response to
 the strobe signal, and controls the selected one of
35 said data-latch circuits to latch a corresponding
 datum of the data in response to the strobe signal;
 and

1 a second control circuit which selects one
of said data-latch circuits in sequence in response to
the clock signal, and controls the selected one of
said data-latch circuits to output a corresponding
5 datum of the data in response to the clock signal.

10 9. The semiconductor device as claimed in
claim 8, further comprising an address-latch circuit
which latches the addresses in sequence in synchronism
with the clock signal, and outputs the addresses in
synchronism with the clock signal.

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20 10. The semiconductor device as claimed in
claim 8, wherein said address-latch circuit operates
in response to a write-enable signal which is
generated in response to a write command to said
semiconductor device.

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30 11. The semiconductor device as claimed in
claim 10, wherein the write-enable signal controls
said first control circuit and said second control
circuit to operate for a predetermined time period
after receiving the write command.

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12. The semiconductor device as claimed in

1 claim 8, wherein said first control circuit includes a
first frequency divider configured to divide a
frequency of the strobe signal, and selects one of
said data-latch circuits in sequence by using the
5 frequency-divided strobe signal from said first
frequency divider, and said second control circuit
includes a second frequency divider configured to
divide a frequency of the clock signal, and selects
one of said data-latch circuits in sequence by using
10 the frequency-divided clock signal from said second
frequency divider.

15 13. The semiconductor device as claimed in
claim 9, further comprising
an address-generation circuit which
increments one of the addresses latched by said
20 address-latch circuit, and supplies the incremented
address to said address-latch circuit,
wherein said address-latch circuit is
configured so as to be capable of selecting the
addresses externally provided or the incremented
25 address supplied from said address-generation circuit
for the latching operation thereof.

30 14. The semiconductor device as claimed in
claim 8, wherein each of said data-latch circuits
includes:
a first latch which latches a corresponding
35 datum of the data in synchronism with a rising edge of
the strobe signal; and
a second latch which latches a corresponding

1 datum of the data in synchronism with a falling edge
of the strobe signal.

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15 15. The semiconductor device as claimed in
claim 9, wherein said address-latch circuit includes a
delay circuit which delays output timings of the
10 addresses by a predetermined number of cycles of the
clock signal.

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16. The semiconductor device as claimed in
claim 1, further comprising an address buffer, wherein
said address-latch circuits supply the addresses to
said address buffer without a clock-cycle delay during
20 a read operation.

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25 17. The semiconductor device as claimed in
claim 9, further comprising an address buffer, wherein
said address-latch circuit supplies the addresses to
said address buffer without a clock-cycle delay during
a read operation.

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18. A memory circuit, comprising:
35 an address-input circuit which latches
address signals in response to a clock signal, and
outputs the address signals in response to a timing

1 signal;

 a data-input circuit which latches data
signals in response to a strobe signal, and outputs
the data signals in response to the timing signal; and

5 an internal circuit which writes the data
signals supplied from the data-input circuit in memory
cells indicated by the address signals supplied from
the address-input circuit.

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19. The memory circuit as claimed in claim
18, wherein said timing signal is responsive to the
15 strobe signal.

20 20. The memory circuit as claimed in claim
18, wherein said timing signal is responsive to the
clock signal.

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 21. The memory circuit as claimed in claim
18, wherein the strobe signal has a cycle identical to
that of the clock signal, and a first timing of a
30 first rising edge of the strobe signal is different
from a second timing of a corresponding rising edge of
the clock signal.

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22. The memory circuit as claimed in claim

1 21, wherein the first timing is later than the second
 timing with a timing gap therebetween being shorter
 than one cycle of the clock signal.

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 23. The memory circuit as claimed in claim
 18, wherein said data-input circuit latches the data
 signals in synchronism with rising edges and falling
10 edges of the strobe signal.

15 24. The memory circuit as claimed in claim
 19, wherein the address-input circuit includes:

 a first latch circuit which latches the
 address signal in response to a first rising edge of
 the clock signal, and outputs the address signal in
20 response to the timing signal; and

 a second latch circuit, connected in
 parallel to the first latch circuit, which latches
 next address signal in response to a next rising edge
 of the clock signal, and outputs the next address
25 signal in response to the timing signal.

30 25. The memory circuit as claimed in claim
 24, wherein the address-input circuit outputs the
 address signal prior to outputting the next address
 signal.

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1 26. The memory circuit as claimed in claim
19, further comprising:

 a decode circuit which receives the address
signal from the address-input circuit, and decodes the
5 address signal in response to a first activation
signal; and

 a write amplifier which receives the data
signal from the data-input circuit, and amplifies the
data signal in response to a second activation signal
10 in a data-write mode,

 wherein both of the first and second
activation signals are responsive to the strobe signal
in the data-write mode.

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 27. The memory circuit as claimed in claim
26, wherein in a data-read mode, the first activation
20 signal is responsive to the clock signal, and the
second activation signal is in a deactivated state.

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 28. The memory circuit as claimed in claim
20, wherein said data-input circuit includes:

 a first data-input circuit which latches the
data signals in sequence in response to a first rising
30 edge and a first falling edge of the strobe signal,
and outputs the data signals in parallel in response
to the timing signal; and

 a second data-input circuit, connected in
parallel to the first data-input circuit, which
35 latches next data signals in sequence in response to a
next rising edge and a next falling edge of the strobe
signal, and outputs the next data signals in parallel

1 in response to the timing signal.

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29. The memory circuit as claimed in claim
20, wherein said data-input circuit includes a first
data-input circuit which latches the data signals in
sequence in response to a rising edge and a falling
10 edge of the strobe signal, and outputs the data
signals in parallel in response to the timing signal.

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30. The memory circuit as claimed in claim
29, wherein said first data-input circuit latches next
data signals after outputting the data signals.

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31. The memory circuit as claimed in claim
28, wherein said data-input circuit outputs the data
25 signals prior to outputting the next data signals.

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32. The memory circuit as claimed in claim
20, wherein said address-input circuit includes a
shift register which operates in response to the clock
signal.

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1 33. The memory circuit as claimed in claim
19, wherein said address-input circuit includes a
shift register which operates in response to the clock
signal.

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 34. A method of writing data in the memory
10 circuit of claim 33, comprising a step of adjusting an
input timing of the strobe signal relative to the
clock signal such that said shift register stores two
addresses at a time when the data-input circuit
outputs the data signals.

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 35. The memory circuit as claimed in claim
20 20, further comprising:

 a decode circuit which receives the address
signal from the address-input circuit, and decodes the
address signal in response to a first activation
signal; and

25 a write amplifier which receives the data
signal from the data-input circuit, and amplifies the
data signal in response to a second activation signal
in a data-write mode,

 wherein both of the first and second
30 activation signals are responsive to the clock signal
in the data-write mode.

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 36. The memory circuit as claimed in claim
35, wherein in a data-read mode, the first activation

1 signal is responsive to the clock signal, and the
second activation signal is in a deactivated state.

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37. The memory circuit as claimed in claim
26, wherein in the data-write mode, the first
activation signal activates said decode circuit after
10 said address-input circuit outputs the address
signals, and the second activation signal activates
said write amplifier after said data-input circuit
outputs the data signals.

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38. The memory circuit as claimed in claim
35, wherein in the data-write mode, the first
20 activation signal activates said decode circuit after
said address-input circuit outputs the address
signals, and the second activation signal activates
said write amplifier after said data-input circuit
outputs the data signals.

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39. The memory circuit as claimed in claim
30 32, wherein said shift register delays the address
signals by 1.5 clock cycles of the clock signal.

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40. The memory circuit as claimed in claim
18, wherein a timing at which said address-input

1 circuit outputs the address signals is concurrent with
a timing at which said data-input circuit outputs the
data signals corresponding to the address signals.

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41. The memory circuit as claimed in claim
32, further comprising a bypass circuit provided in
10 parallel to said shift register, wherein the address
signals pass through the bypass circuit and bypass
said shift register in a data-read mode.

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42. The memory circuit as claimed in claim
33, further comprising a bypass circuit provided in
parallel to said shift register, wherein the address
20 signals pass through the bypass circuit and bypass
said shift register in a data-read mode.

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